



## Press Release

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### Warm-blooded crocs thrived in Jurassic cold snap, fossil teeth show

They are revered throughout nature as chilling predators ... now research shows crocodiles have not always been the cold-blooded creatures they are today.

Scientists who analysed fossil teeth belonging to some of the species' ancient ancestors say at least one type of prehistoric crocodile was warm blooded.

The findings suggest the animals – called metriorhynchids – could raise their body temperature to stay warm in falling temperatures in a manner similar to modern-day birds and mammals.

Researchers say this likely enabled the animals, which lived during the Jurassic and Cretaceous periods, to thrive during a spell of global cooling around 150 million years ago. Their cold-blooded cousins, by contrast, struggled to adapt but ultimately survived.

Being warm-blooded was key to metriorhynchids evolving a dolphin-like body – including flippers and a tail fin – and venturing out to live in the open oceans, the scientists say.

A team of palaeontologists, including researchers from the University of Edinburgh, analysed the mineral make-up of teeth from metriorhynchids and a closely related family known as teleosaurids.

Oxygen levels in the fossil tooth enamel were affected by the animals' body temperature, and measuring them enabled researchers to discover whether they were cold- or warm-blooded.

Their analysis shows that metriorhynchids could raise their body temperature above that of the surroundings by using their metabolism to generate heat, meaning they were warm-blooded. While they were less efficient at heating themselves than most other warm-blooded animals, their adaptability likely helped them survive when sea temperatures dropped at the end of the Jurassic Period.

Teleosaurids were cold-blooded, the researchers found, and kept warm in the same way as modern crocodiles – by basking in the sun. They may have struggled to stay warm when sea temperatures fell, which could partly explain why many of them died out at the end of the Jurassic Period.

The study, published in *Philosophical Transactions of the Royal Society B*, was supported by the Leverhulme Trust. The study is available here: <https://doi.org/10.1098/rstb.2019.0139>.

Dr Mark Young, of the University of Edinburgh's School of GeoSciences, who co-authored the study, said: "This discovery helps us better understand these bizarre crocs. They rapidly changed from animals looking similar to modern long-snouted crocodiles, to ones with flippers, a tail fin and massive, forward-facing eyes. Their transition from land to sea dwellers increasingly mirrors the better-known transformation undergone by dolphins and whales millions of years ago."

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